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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/730,263

12/09/2003

Masashi Shiraishi

12553/126

3326

23838

7590

12/28/2005

KENYON & KENYON

1500 K STREET NW

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WASHINGTON, DC 20005

EXAMINER

PATEL, ISHWARBHAI B

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/730,263

Applicant(s)

SHIRAIISHI ET AL.

Examiner

Ishwar (I. B.) Patel

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-53 is/are pending in the application.
4a) Of the above claim(s) 32-41, 45, 46, 52 and 53 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 27-31, 42-44 and 47-51 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continuation

1. This application is a continuation of application No. 09/696,276, filed on October 25, 2000. The examiner has reviewed the prior art used in the parent application. MPEP 2001.06 (b).

Election/Restrictions

2. Applicant's election between the process and product claims, without traverse of group I, claims 27-36 and 37-41, in the reply filed on October 3, 2005 is acknowledged.

Regarding the specie election from the elected product claims, the applicant elected specie I, reading on figure 6, claim 27-36, 42-45 and 47-51, with traverse. The traversal is on the ground(s) that the described species are related to each other and would not present an undue burden upon the office to examine each of claims 27-36 and 42-53. This is not found persuasive because various embodiments constitute different specie and search for all the species would be burdensome to the examiner.

Also, claim 32, with the limitation "a bottom surface of said overcoat layer not overlapping a top surface of the bonding pad" and claim 45, with the limitation "wherein the overcoat layer comprise two sections separated **by a plating of conductive material**" is not reading the elected specie. Therefore, claim 32, depended claims 33-36 and claim 45 are further withdrawn from the consideration.

Claims 27-31, 42-45 and 47-51 are examined for patentability and claims 32-41, 45, 46, 52 and 53 are withdrawn as a non elected invention.

Art Unit: 2841

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

3. Claim 27-31 and 48-51 are objected to because of the following: Regarding claims 27 and 48, the limitation "wherein the conductive structure comprises a filling completely occupying a space formed by the at least one bonding pad, the conductive layer, and the at least two sections of the overcoat layer" is unclear. Description of figure 6, does not disclose any filling material. Rather filling material is recited in the description of figure 7, which has not been the elected specie. Claims 28-31 and 49-51 depend upon claims 27 and 48 respectively and carry the same deficiency. For the examination purpose the conductive adhesive filling the space is further considered as the filling material. The prior art applied accordingly.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 27-31, 42-44 and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al., US Patent No. 5,065,505 (Matsubara) in view of

Omoya et al., US Patent No. 5,641,996 (Omoya) and Bearinger et al., US Patent No. 5,611,884 (Bearinger).

Regarding claim 27, Matsubara, in figure 1, discloses a flex-print circuit (FPC) attached to at least one bonding pad (7), comprising: a base film (2); a conductive layer situated below the base film (6); an overcoat layer (8) comprising at least two sections situated below the conductive layer (overcoat layer on either side of element 6), a bottom surface of each section overlapping partially and to be pressed onto a top surface of the bonding pad (overcoat layer 8 on periphery of the element 6 is partially overlapping the bonding pad 7 and pressing the pad through the element 9); and a conductive structure (5) forming an electric conduit between the conductive layer and the at least one bonding pad.

Matsubara does not disclose anisotropic conductive adhesive being disposed at least partially surrounding the conductive structure for bonding the FPC to the at least one bonding pad, wherein the conductive structure comprises a filling completely occupying a space formed by the at least one bonding pad, the conductive layer, and the at least two sections of the overcoat layer.

Omoya, in figure 3, disclose a connection between electrode pad (2) and terminal electrode (5) with a conductive structure (gold bump 14) along with conductive adhesive (4) partially surrounding the conductive structure and further the gap between the element 1 and 6 is filled with filling material 7, to have a reliable and stable electrical connection (column 3, line 35-45).

Art Unit: 2841

Bearinger, in figure 3A-3B, discloses a connection between the electrodes of a chip and that of a substrate with a conductive structure (c4 ball) surrounded by a conductive adhesive, to have a reliable electrical connection which will also facilitate reworking / repairing (column 1, line 35-50).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to use a conductive adhesive in combination of conductive structure to have reliable electrical and mechanical connections between two conductive pads.

Therefore, it would have been obvious to a person of ordinary skill in the at the time of applicant's invention to provide the structure of Matsubara with anisotropic conductive adhesive being disposed at least partially surrounding the conductive structure for bonding the FPC to the at least one bonding pad, wherein the conductive structure comprises a filling completely occupying a space formed by the at least one bonding pad, the conductive layer, and the at least two sections of the overcoat layer, as taught by Omoya and Bearinger, in order to have a reliable and stable electrical and mechanical connections.

Regarding claim 28-31, the modified structure of Matsubara does not disclose the filling less than 10 μm thick, as claimed in claim 28, the filling about 10 to 38 μm thick, as claimed in claim 29, the filling is equal to the overcoat layer, as claimed in claim 30, and thinner than the overcoat layer, as claimed in claim 31. However, as seen figure 1 of Matsubara, the filling thickness will depend upon the size of the conductive structure (5), which will depend upon the gap required

Art Unit: 2841

between the element 2 and 4. Matsubara, further discloses the size of the conductive structure (5) of about 5 μm to a maximum of 60 μm (column 9, line 54-65). A person of ordinary skill in the art at the time of applicant's invention would have been motivated to select the size of conductive structure and in turn the thickness of filling material depending upon the gap required between the two components. Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the structure of Matsubara, with the thickness of the filling material as claimed in claim 28-31, in order to have desired gap between the two components.

Regarding claim 42, Matsubara, in figure 1, discloses a flex-print circuit (FPC) attached to a bonding pad (7), comprising: a conductive layer (6), in said flex print circuit, bonded to the bonding pad using a conductive bump (5) lodged between the conductive layer and the bonding pad.

Matsubara does not disclose an anisotropic conductive adhesive also used along with the conductive bump.

Omoya, in figure 3, disclose a connection between electrode pad (2) and terminal electrode (5) with a conductive structure (gold bump 14) along with conductive adhesive (4) partially surrounding the conductive structure and further the gap between the

Art Unit: 2841

element 1 and 6 is filled with filling material 7, to have a reliable and stable electrical connection (column 3, line 35-45).

Bearinger, in figure 3A-3B, discloses a connection between the electrodes of a chip and that of a substrate with a conductive structure (c4 ball) surrounded by a conductive adhesive, to have a reliable electrical connection which will also facilitate reworking / repairing (column 1, line 35-50).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to use a conductive adhesive in combination of conductive structure to have reliable and electrical mechanical connections between two conductive pads.

Therefore, it would have been obvious to a person of ordinary skill in the at the time of applicant's invention to provide the structure of Matsubara with anisotropic conductive adhesive along with the conductive structure for bonding the FPC to the bonding pad, as taught by Omoya and Bearinger, in order to have a reliable and stable electrical and mechanical connections.

Regarding claim 43, the modified structure of Matsubara further discloses the conductive bump comprises gold (column 9, line 54-60).

Regarding claim 44, the modified structure of Matsubara further discloses an overcoat layer (8b) positioned below the conductive layer.

Regarding claim 47, the modified structure of Matsubara further discloses the anisotropic conductive adhesive comprises anisotropic film, as applied to claim 42.

Regarding claim 48, Matsubara, in figure 1 discloses a bonding device adapted for attachment to a bonding pad, the bonding device comprising: a base film (2); a conductive layer (6) having a first side and a second side wherein a first side of the conductive layer is attached to the base film; an overcoat layer (8b) attached to a first portion of a second side of the conductive layer, and a conductive element (5) attached to a second portion of the second side of the conductive layer wherein the conductive element is adapted to form an electrical conduit between the conductive layer and the attached bonding pad, and the overcoat layer is to press against said bonding pad (overcoat layer 8 on periphery of the element 6 is partially overlapping the bonding pad 7 and pressing the pad through the element 9).

Matsubara does not disclose a conductive adhesive filling that completely occupies a space formed by the bonding pad, the conductive layer, and the overcoat layer when the bonding device is attached to the bonding pad.

Omoya, in figure 3, disclose a connection between electrode pad (2) and terminal electrode (5) with a conductive structure (gold bump 14) along with conductive adhesive (4) partially surrounding the conductive structure and further the gap between the element 1 and 6 is filled with filling material 7, to have a reliable and stable electrical connection (column 3, line 35-45).

Art Unit: 2841

Bearinger, in figure 3A-3B, discloses a connection between the electrodes of a chip and that of a substrate with a conductive structure (c4 ball) surrounded by a conductive adhesive, to have a reliable electrical connection which will also facilitate reworking / repairing (column 1, line 35-50).

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to use a conductive adhesive in combination of conductive structure to have reliable electrical and mechanical connections between two conductive pads.

Therefore, it would have been obvious to a person of ordinary skill in the at the time of applicant's invention to provide the structure of Matsubara with anisotropic conductive along with the conductive structure for bonding the FPC to the bonding pad, as taught by Omoya and Bearinger, in order to have a reliable and stable electrical and mechanical connections.

Regarding claim 49-51, the modified structure of Matsubara does not disclose the filling less than 10 μm thick, as claimed in claim 49, the filling about 10 to 38 μm thick, as claimed in claim 50, and the filling is equal to the overcoat layer, as claimed in claim 51. However, as seen figure 1 of Matsubara, the filling thickness will depend upon the size of the conductive structure (5), which will depend upon the gap required between the element 2 and 4. Matsubara, further discloses the size of the conductive structure (5) of about 5 μm to a maximum of 60 μm (column 9, line 54-65). A person of ordinary skill in the art at the time of applicant's invention would have been motivated to select the size of conductive structure and in

Art Unit: 2841

turn the thickness of filling material depending upon the gap required between the two components. Also, Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the structure of Matsubara, with the thickness of the filling material as claimed in claim 49-51, in order to have desired gap between the two components.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 27-31, 42-44, and 47-51 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,703,566, hereafter Pat566. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

Regarding claim 27, claims 1 and 6, of Pat566, discloses a flex-print circuit (FPC) attached to at least one bonding pad on a suspension of a head gimbal assembly in a hard disk drive using anisotropic conductive adhesive, comprising: a base film (line 5); a conductive layer situated below the base film (line 6); an overcoat layer comprising at least two sections situated below the conductive layer, a bottom surface of each section overlapping partially and to be pressed onto a top surface of the bonding pad (line 7-10); and a conductive structure forming an electric conduit between the conductive layer and the at least one bonding pad, said anisotropic conductive adhesive being disposed at least partially surrounding the conductive structure for bonding the FPC to the at least one bonding pad (line 11-16), wherein the conductive structure comprises a filling completely occupying a space formed by the at least one bonding pad, the conductive layer, and the at least two sections of the overcoat layer (claim 6, the space is fully occupied by conductive adhesive and conductive structure).

Regarding claim 28-31, though the claims of Pat566, does not disclose the filling less than 10 μm thick, as claimed in claim 28, the filling is about 10 to 38 μm thick, as

Art Unit: 2841

claimed in claim 29, the filling is equal to the overcoat layer, as claimed in claim 30, and thinner than the overcoat layer, as claimed in claim 31. However, as recited in claim 1 of Pat566, the overcoat layer is below the base film and pressed onto a top surface of the bonding pad, the thickness of the filling material is equal to a space between the conductive layer and the top of the bonding pad, which will depend upon the thickness of the overcoat layer and any adhesive, if used, between the conductive layer and the overcoat layer. In short the thickness of the filling material will depend upon the thickness of the overcoat layer. The overcoat layer thickness will be selected based on the isolation required between the conductive layer and the circuit pattern on the layer forming the conductive pad. Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the structure of Pat566 with the filling material having a thickness, as claimed in claim 28-20, in order to have desired isolating between the conductive layers.

Regarding claim 42, Claim 7 of Pat566 discloses a flex-print circuit (FPC) attached to a bonding pad, comprising: a conductive layer (line 3), in said flex print circuit, bonded to the bonding pad using anisotropic conductive adhesive (line 4), and a conductive bump lodged between the conductive layer and the bonding pad (line 7-8).

Regarding claim 43, the claims of Pat566 further discloses the conductive bump comprises gold (claim 8).

Regarding claim 44, the claims of Pat566 further discloses an overcoat layer positioned below the conductive layer (claim 7).

Regarding claim 47, the claims of Pat566 further discloses the anisotropic conductive adhesive comprises anisotropic film (claim 11).

Regarding claim 48, the claim 12 of Pat566 discloses a bonding device adapted for attachment to a bonding pad with an anisotropic conductive adhesive, the bonding device comprising: a base film (line 4); a conductive layer having a first side and a second side wherein a first side of the conductive layer is attached to the base film (line 5-7); an overcoat layer attached to a first portion of a second side of the conductive layer (line 8-9), and a conductive element attached to a second portion of the second side of the conductive layer wherein the conductive element is adapted to form an electrical conduit between the conductive layer and the attached bonding pad, and the overcoat layer is to press against said bonding pad (line 10-15), wherein the conductive element comprises a filling that completely occupies a space formed by the bonding pad, the conductive layer, and the overcoat layer when the bonding device is attached to the bonding pad, (claim 19, the space is fully occupied by conductive adhesive and conductive structure).

Regarding claim 49-51, though the claims of Pat566, does not disclose the filling less than 10 μm thick, as claimed in claim 49, the filling is about 10 to 38 μm thick, as claimed in claim 50, and the filling is equal to the overcoat layer, as claimed in claim 51. However, as recited in claim 1 of Pat566, the overcoat layer is below the base film and pressed onto a top surface of the bonding pad, the thickness of the filling material is equal to a space between the conductive layer and the top of the bonding pad, which will depend upon the thickness of the overcoat layer and any adhesive, if used, between the conductive layer and the overcoat layer. In short the thickness of the filling material will depend upon the thickness of the overcoat layer. The overcoat layer thickness will be selected based on the isolation required between the conductive layer and the circuit pattern on the layer forming the conductive pad. Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the structure of Pat566 with the filling material having a thickness, as claimed in claim 49-51, in order to have desired isolating between the conductive layers.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Castleberry, US Patent No. 5,463,242, in figure 2, discloses a connection between a flexible board (132) having conductive layer (135) with a pad (110) by a conductive structure 125 and the gap between the conductive layer and the pad is filled by an adhesive (120).

Inaba, US Patent No. 5,961,334, in figure 3, discloses a suspension connection structure with a spherical and pillar shaped resin elastic bodies formed between the terminals (6 and 8, column 3, line 60-65).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2841

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ishwar (I. B.) Patel
Examiner
Art Unit: 2841
December 25, 2005